

# Sequence Listing

<110> Sidhu, Sachdev S.  
Weiss, Gregory A.  
Wells, James A.

<120> TRANSFORMATION EFFICIENCY IN PHAGE DISPLAY THROUGH MODIFICATION OF A COAT PROTEIN

<130> 11669.141USWO

<140> US 09/380,447  
<141> 1999-09-01

<150> US 60/134,870  
<151> 1999-05-19

<150> US 60/133,296  
<151> 1999-05-10

<150> US 60/103,514  
<151> 1998-10-08

<150> US 60/094,291  
<151> 1998-07-27

<150> PCT/USUS99/16596  
<151> 1999-07-22

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                   20                  25                  30  
  
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			20					25					30	

Val	Ile	Val	Gly	Ala	Thr	Ile	Gly	Ile	Lys	Leu	Phe	Lys	Lys	Phe
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Thr	Ser	Lys	Ala	Ser
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			20					25					30	

Val	Ile	Val	Gly	Ala	Thr	Ile	Gly	Ile	Lys	Leu	Phe	Lys	Lys	Phe
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Ser Ser Lys Ala Val  
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 20 25 30

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atcgtc 56

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taactccctg caagcc 66

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c 51

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tatcggttat gcgtgg 66

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 <210> 81  
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 <223> linker oligonucleotide  
  
 <400> 81

cagagcggtg gaggatccgg gagctccagc gccgagggt 39

<210> 82  
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 <212> PRT  
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<220>  
 <223> peptide flag

<400> 82  
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 1 5 10

<210> 83  
 <211> 60  
 <212> DNA  
 <213> Artificial sequence

<220>  
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<400> 83  
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 ccatcaccat 60

<210> 84  
 <211> 60  
 <212> DNA  
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<220>  
 <223> mutagenic oligonucleotide

<400> 84  
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 taaggcgcca 60

<210> 85  
 <211> 33  
 <212> DNA  
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<220>  
 <223> mutagenic oligonucleotide

<400> 85  
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<210> 86  
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 <400> 86  
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 acctcgaaag caagcgggtgg ccatcaccat caccatgcg 39  
  
 <210> 88  
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 <400> 88  
 acctcgaaag caagcgggtgg tggccatcac catcaccatg cg 42  
  
 <210> 89  
 <211> 45  
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 <400> 89  
 acctcgaaag caagcggcgg tgggtggccat caccatcacc atgcg 45  
  
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 <211> 57  
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 tcaccatgcg 60  
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 ccatcaccat gcg 63  
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 <211> 69  
 <212> DNA  
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<223> mutagenic oligonucleotide

<400> 95  
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<211> 75  
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<220>  
<223> mutagenic oligonucleotide

<400> 96  
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<210> 97  
<211> 81  
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<220>  
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<400> 97  
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tggcgggtggt ggccatcacc atcaccatgc g 81

<210> 98  
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<400> 98  
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<210> 100  
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<220>  
 <223> zone library

<220>  
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 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35  
 <223> unknown base

<400> 100  
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 ttttgttttt 60

<210> 101  
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<220>  
 <223> zone library

<220>  
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 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35  
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<400> 101  
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 tgttgat 57

<210> 102  
 <211> 69  
 <212> DNA  
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<220>  
 <223> zone library

<220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,  
 46-47  
 <223> unknown base

<400> 102  
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ttggatttgg gctgtcggg 69

<210> 103  
 <211> 69  
 <212> DNA  
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<220>  
 <223> zone library

<220>  
 <221> unsure  
 <222> 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44, 46-47,  
 49-50  
 <223> unknown base

<400> 103  
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sgcggctgat gcattccca 69

<210> 104  
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<220>  
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<220>  
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 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,  
 46-47  
 <223> unknown base

<400> 104  
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tgctaaggcg ccagacgatg gt 72

<210> 105  
 <211> 69  
 <212> DNA  
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<220>

<223> zone library

<220>  
 <221> unsure  
 <222> 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44, 46-47,  
 49-50  
 <223> unknown base

<400> 105  
 agcgctcagc tgagcaactt cnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 50  
  
 sgcggctgat gcattccca 69  
  
 <210> 106  
 <211> 81  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> linker library  
  
 <400> 106  
 gatgggtgaag ctgcggtctvv cvvcvvcvvc vvcvvcvvcv vcvvcvvcvv 50  
  
 cvvcvvcvvc gatgcattcc caactatacc a 81  
  
 <210> 107  
 <211> 96  
 <212> DNA  
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 <220>  
 <223> mutagenic oligonucleotide  
  
 <220>  
 <221> unsure  
 <222> 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, 67,  
 70, 73, 76  
 <223> unknown base  
  
 <400> 107  
 accttcaaaa agtttctgaa anwtknknwt nytnytnktn wtnwnwtwnw 50  
  
 tnwnknkgnyt nkgnytwnwn ktnwnwtnga gactgctagc gctcag 96  
  
 <210> 108  
 <211> 21  
 <212> DNA  
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 <400> 108  
 caccatcacc atcaccatgc g 21  
  
 <210> 109  
  
 <211> 30  
 <212> DNA  
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 <220>  
 <223> linker oligonucleotide

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<400> 109
gcctgggagg agaacatcga cagcgcccc 30

<210> 110
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 110
Ala Trp Glu Glu Asn Ile Asp Ser Ala Pro
  1             5             10

<210> 111
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 111
cagtacggga cgccggacac cgacaccgac 30

<210> 112
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 112
Gln Tyr Gly Thr Pro Asp Thr Asp Thr Asp
  1             5             10

<210> 113
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 113
acggggtggt tggaggggccc cgacaccccc 30

<210> 114

<211> 10
<212> PRT
<213> Artificial sequence

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<220>
<223> linker peptide

<400> 114
  Thr Gly Trp Leu Glu Gly Pro Asp Thr Pro
    1             5             10

<210> 115
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 115
  ctcattgggcc ccggcgcgga cggc 24

<210> 116
<211> 8
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 116
  Leu Met Gly Pro Gly Ala Asp Gly
    1             5

<210> 117
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 117
  cactgactcgg tcccgagcaa cggc 24

<210> 118
<211> 8
<212> PRT
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<220>
<223> linker peptide

<400> 118
  His Asp Ser Val Pro Ser Asn Gly
    1             5

<210> 119
<211> 120

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<212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> linker oligonucleotide  
  
 <400> 119  
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 gctgagcaac ttcgctgcta aggcgccaga cgatgggtgaa gctgcggctc 100  
 accatcacca tcaccatgcg 120  
  
 <210> 120  
 <211> 40  
 <212> PRT  
 <213> Artificial sequence  
  
 <220>  
 <223> linker peptide  
  
 <400> 120  
 Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Glu Thr Ala Ser  
 1 5 10 15  
 Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro Asp Asp Gly Glu  
 20 25 30  
 Ala Ala Ala His His His His His His Ala  
 35 40  
  
 <210> 121  
 <211> 41  
 <212> PRT  
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 <220>  
 <223> M13 coat protein VIII library  
  
 <220>  
 <221> unsure  
 <222> 12  
 <223> unknown amino acid  
  
 <400> 121  
 Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Xaa Glu Thr Ala  
 1 5 10 15  
 Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro Asp Asp Gly  
 20 25 30  
 Glu Ala Ala Ala His His His His His His Ala  
 35 40  
  
 <210> 122

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<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 122
gctgcggctg atgcatctgg tagcgtctag agccaccatc accatcacca 50

t 51

<210> 123
<211> 54
<212> PRT
<213> Artificial sequence

<220>
<223> P1-1 plus linker

<400> 123
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Val Phe Val Phe
 1             5             10             15

Ser Val Asp Val Asp Asn Asn Trp Ile Trp Ala Val Gly Ile Ile
                20             25             30

Glu Thr Ala Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro
                35             40             45

Asp Asp Gly Glu Ala Ala Ala Asp Ala
                50

<210> 124
<211> 150
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII variant

<400> 124
atgagcaaga gcactttcaa aaagtttctg aaagtttttg ttttttctgt 50

tgatgttgat aataattgga tttgggctgt cggtattatt tacatgctcc 100

tcgtggaggc gtcgccctgg gctgctaagg cgccagacga tgggtgaagct 150

<210> 125
<211> 48
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

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<220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29  
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 <210> 126  
 <211> 51  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> mutagenic oligonucleotide library  
  
 <220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32  
 <223> unknown base  
  
 <400> 126  
 ttcacctcga aagcaagcnn snnsnnsnns nnsccaccatc accatcacca 50  
  
 t 51  
  
 <210> 127  
 <211> 54  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> mutagenic oligonucleotide library  
  
 <220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35  
 <223> unknown base  
  
 <400> 127  
 ttcacctcga aagcaagcnn snnsnnsnns nnsnnsccacc atcaccatca 50  
  
 ccat 54  
  
 <210> 128  
 <211> 60  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> mutagenic oligonucleotide library  
  
 <220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35

<223> unknown base  
 <400> 128  
 ttcacctcga aagcaagcnn snnsnnsnns nnsnnsvvcv vccaccatca 50  
 ccatcaccat 60  
 <210> 129  
 <211> 66  
 <212> DNA  
 <213> Artificial sequence  
 <220>  
 <223> mutagenic oligonucleotide library  
 <220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35  
 <223> unknown base  
 <400> 129  
 ttcacctcga aagcaagcnn snnsnnsnns nnsnnsvvcv vcvvcvcca 50  
 ccatcaccat caccat 66  
 <210> 130  
 <211> 75  
 <212> DNA  
 <213> Artificial sequence  
 <220>  
 <223> mutagenic oligonucleotide library  
 <220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35  
 <223> unknown base  
 <400> 130  
 ctgctgaata aggagtctnn snnsnnsnns nnsnnsccacc atcaccatca 50  
 ccattaatca tgccagttct ttg 75  
 <210> 131  
 <211> 81  
 <212> DNA  
 <213> Artificial sequence  
 <220>  
 <223> mutagenic oligonucleotide library  
 <220>  
 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41  
 <223> unknown base

<400> 131  
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 ccatcaccat taatcatgcc agttcttttg g 81  
  
 <210> 132  
 <211> 87  
 <212> DNA  
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 <220>  
 <223> mutagenic oligonucleotide library  
  
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 <221> unsure  
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,  
 46-47  
 <223> unknown base  
  
 <400> 132  
 ctgcgtaata aggagtctnn snnsnnsnns nnsnnsnnsn nsnnnsnnsca 50  
  
 ccatcaccat caccattaat catgccagtt cttttgg 87  
  
 <210> 133  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> linker oligonucleotide  
  
 <400> 133  
 gggcaggcca ggatcgtcta ccggcagaag 30  
  
 <210> 134  
 <211> 10  
 <212> PRT  
 <213> Artificial sequence  
  
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 <400> 134  
 Gly Gln Ala Arg Ile Val Tyr Arg Gln Lys  
 1 5 10  
  
 <210> 135  
 <211> 30  
 <212> DNA  
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<400> 135
  aggatcaggg tcctgcagaa gggcaaggag 30

<210> 136
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 136
  Arg Ile Arg Val Leu Gln Lys Gly Lys Glu
    1             5             10

<210> 137
<211> 30
<212> DNA
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<220>
<223> linker oligonucleotide

<400> 137
  cgcgccaaga tcgagcagat ctgcaaggag 30

<210> 138
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 138
  Arg Ala Lys Ile Glu Gln Ile Cys Lys Glu
    1             5             10

<210> 139
<211> 27
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII fragment oligonucleotide library

<220>
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<222> 2, 4, 8, 10, 13, 17, 20, 23, 26
<223> unknown base

<400> 139
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<210> 140
<211> 30

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<212> DNA  
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 <220>  
 <223> M13 wt coat protein VIII fragment oligonucleotide  
  
 <400> 140  
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 <210> 141  
 <211> 10  
 <212> PRT  
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 <220>  
 <223> M13 wt coat protein VIII fragment  
  
 <400> 141  
 Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala  
 1 5 10  
  
 <210> 142  
 <211> 30  
 <212> DNA  
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 <223> M13 variant coat protein VIII fragment oligonucleotide  
  
 <400> 142  
 gataagagtg agaagttcgc tagagatgct 30  
  
 <210> 143  
 <211> 10  
 <212> PRT  
 <213> Artificial sequence  
  
 <220>  
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 <400> 143  
 Asp Lys Ser Glu Lys Phe Ala Arg Asp Ala  
 1 5 10  
  
 <210> 144  
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 <400> 144  
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<210> 145
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<220>
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<400> 145
Ile Lys Asp Glu Gly Phe Ala Arg Ala Ala
 1             5             10

<210> 146
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 146
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<210> 147
<211> 10
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<220>
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<400> 147
Ile Tyr Ile Lys Glu Thr Ser Lys Asn Ala
 1             5             10

<210> 148
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 148
aattacgttg accaggtcag taaaaatgct 30

<210> 149
<211> 10
<212> PRT
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<220>
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<400> 149
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1              5              10

<210> 150
<211> 30
<212> DNA
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<220>
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<400> 150
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<210> 151
<211> 10
<212> PRT
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<220>
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<400> 151
Ala Lys Ala Glu Glu Phe Ala Glu Ala Ala
 1              5              10


<210> 152
<211> 30
<212> DNA
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<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 152
gctgacattg acgacttcgc tagaagtgct 30


<210> 153
<211> 10
<212> PRT
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<220>
<223> M13 variant coat protein VIII fragment

<400> 153
Ala Asp Ile Asp Asp Phe Ala Arg Ser Ala
 1              5              10


<210> 154
<211> 30
<212> DNA
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<220>
<223> M13 coat protein VIII fragment oligonucleotide library

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<220>  
 <221> unsure  
 <222> 1, 4, 8, 10, 13, 17, 20, 23, 26, 28  
 <223> unknown base

<400> 154  
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<210> 155  
 <211> 30  
 <212> DNA  
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<220>

<223> M13 wt coat protein VIII fragment oligonucleotide

<400> 155  
 tttaactccc tgcaagcctc agcgaccgaa 30

<210> 156  
 <211> 10  
 <212> PRT  
 <213> Artificial sequence

<220>

<223> M13 wt coat protein VIII fragment

<400> 156  
 Phe Asn Ser Leu Gln Ala Ser Ala Thr Glu  
 1 5 10

<210> 157  
 <211> 30  
 <212> DNA  
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<220>

<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 157  
 tatgaggctc ttgaggatat tgctactaac 30

<210> 158  
 <211> 10  
 <212> PRT  
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<220>

<223> M13 variant coat protein VIII fragment

<400> 158  
 Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn  
 1 5 10

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<210> 159
<211> 30
<212> DNA
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<220>
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<400> 159
tatgaggctc ttgaggatat tgctactaac 30

<210> 160
<211> 10
<212> PRT
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<220>
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<400> 160
Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
  1             5             10

<210> 161
<211> 30
<212> DNA
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<220>
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<400> 161
tatgaggctc ttgaggatat tgctactaac 30

<210> 162
<211> 10
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<220>
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<400> 162
Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
  1             5             10

<210> 163
<211> 30
<212> DNA
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<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 163

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<400> 164

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<211> 30

<212> DNA

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<220>

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<400> 165

cttaaggatc ttaaggctac tggtattcag 30

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<220>

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<400> 166

Leu	Lys	Asp	Leu	Lys	Ala	Thr	Val	Ile	Gln
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<400> 167

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<210> 168

<211> 10

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<400> 176
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1           5           10

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<400> 190
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<210> 191
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<210> 193
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<400> 193
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<210> 194
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<212> DNA
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<220>
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<210> 195
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<210> 197

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<210> 198
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<220>
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<400> 198
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<210> 199
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<400> 199
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<210> 200
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<220>
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<210> 201
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<400> 201
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 1 5 10  
  
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<400> 206  
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 1 5 10  
  
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<400> 211
Ala Arg Ala Asn Arg
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<210> 212
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<400> 212
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<210> 213
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<220>
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<400> 213
Arg His Asn Arg Arg
 1             5

<210> 214
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<220>
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<400> 214
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<220>
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<400> 217  
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<210> 218  
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<400> 218  
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<400> 222
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<210> 223
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<220>
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<400> 223
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<210> 224
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<220>
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<400> 224
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<210> 225
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<220>
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<400> 225
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<400> 228
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<400> 229
Thr Pro Gly His Gly His Pro His Pro Asp
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<210> 230
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<400> 232
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<220>
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<400> 233
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    1             5             10

<210> 234
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<400> 234
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<210> 235
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<400> 236
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<400> 237
Asp Arg Gly Arg Thr Asn Arg Thr Asp Thr
  1             5             10

<210> 238
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<400> 238
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<210> 239
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<400> 239
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<210> 242
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 1 5 10 15  
  
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<400> 251
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<210> 252
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cgccaccggc 60

<210> 253
<211> 20
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<400> 253
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Ala Arg Gly Thr Gly
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<210> 254

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<211> 60
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<220>
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ccacgcccc 60

<210> 255
<211> 20
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<400> 255
Asp Gly Ser Pro Asn Gly Gly Arg Gly His Asn Asp Asn Pro Pro
 1             5             10             15

Arg Gly His Ala Pro
      20

<210> 256
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<400> 256
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caccgccagc 60

<210> 257
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<220>
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<400> 257
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 1             5             10             15

Pro Gly Thr Ala Ser
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<210> 258

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 Ala Arg Ser Gly Pro  
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cagcaacggc agcgacagca gcagc 75

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<212> PRT
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<220>
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<400> 263
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Arg Gly Ser Asn Gly Ser Asp Ser Ser Ser
          20          25

<210> 264
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<220>
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<400> 264
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ccccacggc cacagcagcc cccgc 75

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<220>
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<400> 265
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 1           5           10          15

Asp Gly Pro His Gly His Ser Ser Pro Arg
          20          25

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<210> 266  
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 52, 55  
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 tnwtntwt 57

<210> 267  
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<220>  
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<400> 267  
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 tattgttt 57

<210> 268  
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<220>  
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<400> 268  
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 1 5 10 15  
 Val Gly Ile Val

<210> 269  
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<400> 269  
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 ttatggtt 57  
  
 <210> 270  
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 1 5 10 15  
  
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<400> 278

Tyr Phe Leu Ala Phe Ser Ile Ile Asp Leu Phe Arg Leu Trp Leu  
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Tyr Phe Val Asn

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<210> 280

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1              5

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Asp Asp Gly Glu Ala
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Ala Ser Ala Thr Glu
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His His His His His His
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Xaa Gly Gly

<210> 293
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<220>
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<400> 293
His His His His
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